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# *Cooperative* ECONOMIC INSECT REPORT

*Issued by*

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

# AGRICULTURAL RESEARCH SERVICE

# PLANT PEST CONTROL DIVISION

## SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 15 April 2, 1965 Number 14

# COOPERATIVE ECONOMIC INSECT REPORT

## HIGHLIGHTS

CORN LEAF APHID scattered and heavy on grain in areas of Arizona and damaging barley in Washington County, Utah; ranged 0-200 per linear foot in oats in Pontotoc County, Oklahoma. DESERT CORN FLEA BEETLE required some controls on sorghums and sweet corn in Yuma County, Arizona. BROWN WHEAT MITE counts rather high in areas of Oklahoma, with large numbers of winter eggs noted in Ellis County. WINTER GRAIN MITE damaging small grains in areas of Texas. (p. 275). PEA APHID heavy on alfalfa in Arizona and Nevada, and active in isolated areas of Oklahoma. (pp. 275-276). Heavy ALFALFA WEEVIL damage expected in Piedmont area of North Carolina if controls not applied; adults active in Delaware and some activity noted in Colorado. A WEEVIL (Hypera brunneipennis) continues to damage alfalfa in Arizona. (p. 276).

APPLE APHID eggs heavy on apple in Montgomery County, Maryland; eggs of GREEN PEACH APHID present in high numbers on peaches in all orchards checked in Mesa County, Colorado; and SAN JOSE SCALE damaging apple orchard in Weber County, Utah. (pp. 276-277). MELON APHID increasing rapidly on lettuce and cantaloup in areas of Arizona, with controls necessary in many fields. (p. 277).

SOUTHERN PINE BEETLE heavy and killing considerable number of loblolly pines in forested section of Somerset and Worcester Counties, Maryland. PINE NEEDLE SCALE heavy on ornamental pines in areas of Wisconsin. Overwintered eggs of EASTERN TENT CATERPILLAR hatched in southern Alabama; small tents noted in crotches of limbs. (p. 279).

CATTLE LICE heavy and troublesome on cattle in several States; controls urged in Piedmont area of South Carolina. (p. 281).

## DETECTION

New county records reported in California include: WALNUT SCALE (Aspidiotus juglansregiae) in Glenn County (p. 277); an ERIOPHYID MITE (Eriophyes insidiosus) in Tulare, Kern and Fresno Counties (p. 277); two APHIDS, Myzocallis arundinariae in Riverside County and Neophyllaphis podocarpi in Contra Costa County (p. 279); and a MEALYBUG (Phenacoccus nonarius) in Imperial County (p. 280). Other new county records reported were: WHITE-FRINGED BEETLES (Graphognathus spp.) in Alexander County, North Carolina, (p. 282); IMPORTED FIRE ANT (Solenopsis saevissima richteri) from Wakulla, Bradford and Sumter Counties, Florida; Brooks, Evans and Tattnall Counties, Georgia; Hampton County, South Carolina; and Claiborne County, Mississippi, (p. 282).

## SPECIAL REPORTS

Beet Leafhopper Survey, Texas and New Mexico - 1965. (p. 278). Population counts in Texas same as in 1964, but counts lower in New Mexico than last year.

Status of the Screw-worm in the Southwest. (p. 280). No cases have been reported in Southwestern Eradication Area since January 29.

Estimated Losses and Production Costs Attributed to Insects and Related Arthropods Attacking Corn, Soybeans, Tobacco and Cotton in South Carolina, and Alfalfa (seed and hay) in Arizona in 1964. (pp. 284-286).

Summary of Insect Conditions in the United States - 1964

Tobacco Insects. (p. 287).
Cotton Insects. (p. 289).

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Reports in this issue are for week ending March 26, unless otherwise indicated.

# WEATHER OF THE WEEK ENDING MARCH 29

Another cool or cold week brought snow to north central areas, thunder storms to the South, and heavy precipitation to parts of the Southeast. For a large portion of the Nation, the weather patterns were very similar to those for the previous week. Spring was further delayed and winter prolonged in many areas.

TEMPERATURE: From the Continental Divide to the Great Lakes and southward to northern Texas, average temperatures were from 10° to 30° below normal for the second consecutive week. Over parts of the central Plains temperatures have averaged below normal during each week since late January. Temperature departures last week ranged from -30° over central Montana to + 7° in Key West, Florida. Areas with above normal temperatures last week included southwestern Nevada, parts of California, Arizona and New Mexico, the southern Appalachians and other parts of the Southeast.

PRECIPITATION: Heavy rains totaling up to 4 inches fell over a large area from eastern Arkansas to the North Carolina mountains. This same general area received about 2 inches during the previous week. Light rains in Washington and Oregon ended a dry spell that began about March 1. Costal Oregon received from 0.5 to 1.5 inches. Precipitation in most other western areas was light and conditions continued to be dry from southeast New Mexico to extreme southwest Kansas.

SNOW: Snow blanketed a large area from the northern and central Great Plains to New England. Snow depths from 1 to 4 feet extend from the Red River of the North to Lake Huron. While such a heavy snow cover at this time of year is a potential flood threat, the actual rate of melting and flooding will depend on temperatures and other weather conditions during the next 1 to 3 weeks. During last week, snow, sleet, and freezing rain iced roads and slowed travel from the central Plains to southern New England.

WINTER PROLONGED: With preliminary data now in for the first 28 days of March, we find that average temperatures ranged from near normal to extremely cold over the contiguous States. Only the Pacific coast, the Florida Peninsula and the New England area have been near or slightly above normal in temperature. Spring is very late in Texas, Louisiana and Mississippi, but moderately late in Georgia and the Carolinas and in the Southwest. Most areas to the north are still in the grip of winter. With March nearly ended, it is already certain that record or near record cold weather has been affecting the Great Plains region for the past several weeks. Preliminary figures for 28 days show that eastern Montana will probably have the coldest March in at least 50 years. The four-week temperature departures are approximately -17° at Havre, Montana, -13° at Miles City and -12° at Billings. The most recent March with comparable cold in that area was 1951 when average temperatures were within 2° to 3° of those for the current month. Temperature departures of -10° to -14° for 28 days are also found in Wyoming, North and South Dakota, Nebraska, eastern Colorado and parts of Minnesota, Iowa, Missouri and Kansas. While average temperatures in the lower Missouri Valley were about 10° below normal for 28 days, it was still colder than this in 1960. In Missouri, this March will apparently be the second coldest in at least 50 years but it was 2° to 3° colder in the record cold March of 1960. Oklahoma has similar conditions with a colder March in 1960 but no other March as cold for some 50 years. (Summary supplied by U.S. Weather Bureau).

## CEREAL AND FORAGE INSECTS

GREENBUG (Schizaphis graminum) - OKLAHOMA - Ranged 10-30 per linear foot in wheat in Tillman, Comanche and Cotton Counties. Ranged 0-5 per linear foot in wheat in Garvin, Pontotoc, Muskogee, Harmon and Washita Counties. (Okla. Coop. Sur.). ARKANSAS - Counts remain low in northwest; 5-10 per row foot. (Ark. Ins. Sur.).

CORN LEAF APHID (Rhopalosiphum maidis) - UTAH - Damaging barley in St. George-Santa Clara area of Washington County. (Knowlton). ARIZONA - Scattered, heavy infestations found in some grain fields in Yuma County and in areas of Pinal and Maricopa Counties. (Ariz. Coop. Sur.). OKLAHOMA - Ranged 0-200 per linear foot in several fields of oats checked in Pontotoc County. Light (1-3 per linear foot) in few fields of wheat checked in Harmon and Washita Counties. (Okla. Coop. Sur.).

APPLE GRAIN APHID (Rhopalosiphum fitchii) - OKLAHOMA - Ranged 0-150 per linear foot in wheat checked in Cotton and Tillman Counties; infestations very spotty. Counts as high as 1,000 per linear foot in one Cotton County field. Ranged 0-15 per linear foot in wheat checked in Garvin, Pontotoc, Harmon, Comanche, Muskogee and Washita Counties. (Okla. Coop. Sur.).

ENGLISH GRAIN APHID (Macrosiphum avenae) - ARIZONA - Light numbers appearing in grain fields on Yuma Mesa and in Wellton area of Yuma County. (Ariz. Coop. Sur.). OKLAHOMA - Light to absent in wheat in most areas checked; light in oats in Pontotoc County. (Okla. Coop. Sur.).

DESERT CORN FLEA BEETLE (Chaetocnema ectypa) - ARIZONA - Medium to heavy in fields of sorghums and sweet corn in Yuma County. Some controls necessary. (Ariz. Coop. Sur.).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - OKLAHOMA - Live larvae found in 50 percent of dry cornstalks checked in field in Okmulgee County, east central. (Okla. Coop. Sur.).

BROWN WHEAT MITE (Petrobia latens) - OKLAHOMA - Averaged 300 per linear foot in wheat in Ellis County, northwest; large numbers of winter eggs noted. Ranged 50-500 per linear foot in isolated areas of Cotton, Comanche and Tillman Counties. Light numbers (2-3 per linear foot) noted in Harmon County. (Okla. Coop. Sur.). UTAH - Noted on barley in St. George-Santa Clara area of Washington County. (Knowlton).

WINTER GRAIN MITE (Penthaleus major) - TEXAS - Heavy, local populations damaging small grains in Concho County (Menzies) and in Throckmorton County (Rummel). OKLAHOMA - Light numbers noted on wheat in Washita County. (Okla. Coop. Sur.).

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - CALIFORNIA - Medium on lawns locally in Patterson, Stanislaus County. (Cal. Coop. Rpt.).

WHITE GRUBS - TEXAS - Heavy, local infestations reported in clover and native pastures in Lee County. (Spivey).

A MARCH FLY (Dilophus orbatus) - CALIFORNIA - Adults heavy in lawns in Fullerton, Orange County. (Cal. Coop. Rpt.).

WESTERN HARVESTER ANT (Pogonomyrmex occidentalis) - UTAH - Some activity on rangelands noted in Box Elder County. (Knowlton).

PEA APHID (Acyrthosiphon pisum) - NEVADA - Heavy in all alfalfa checked in Moapa Valley, Clark County. (Zoller). Present on alfalfa in Churchill County. (York). ARIZONA - Remains heavy on alfalfa in Yuma, Maricopa and Pinal Counties. Few fields of second crops show damage to new growth. (Ariz. Coop. Sur.). NEW MEXICO - Most infestations very light in alfalfa checked in Bernalillo and Socorro Counties. (N.M. Coop. Rpt.). OKLAHOMA - Active in isolated areas throughout State. Most counts low, but as many as 100 per sweep noted in one field in Garvin County, south central. Averaged 4 per square foot in vetch in Choctaw County, southeast. (Okla. Coop. Sur.). ARKANSAS - Numbers low in forage in northwest; actually declined slightly. (Ark. Ins. Sur.).

SPOTTED ALFALFA APHID (*Therioaphis maculata*) - OKLAHOMA - Light numbers active in alfalfa in Choctaw County, southeast. (Okla. Coop. Sur.).

LYGUS BUGS (*Lygus* spp.) - ARIZONA - Populations continue light in alfalfa in Yuma County and in central part of State. (Ariz. Coop. Sur.).

ALFALFA WEEVIL (*Hypera postica*) - DELAWARE - Few adults active in alfalfa in New Castle County, young larvae rather scarce in area. (Burbutis). NORTH CAROLINA - Heavy damage to alfalfa in Piedmont area expected with advent of warmer temperatures if treatments not applied. Many larvae present as result of eggs hatching during warm fall period and during warm period of February 10-15. It is estimated that 50-75 percent of fall laid eggs have hatched. Larvae now present primarily in second stage. (Campbell). SOUTH CAROLINA - Unseasonably cool weather delaying controls; also delaying damage to alfalfa somewhat. Apparent lack of successful controls due to cool weather in York County. Infestation by this weevil being constantly checked in area. (Nettles et al., Mar. 23). COLORADO - Becoming active on alfalfa in Mesa County with advent of warmer temperatures. Early season dormant controls should be applied before growth starts or exceeds 2 inches. (Bulla).

A WEEVIL (*Hypera brunneipennis*) - ARIZONA - Heavy populations continue to damage alfalfa in Yuma, Maricopa and Pinal Counties, particularly first crop. Lighter numbers found on second cutting of alfalfa. (Ariz. Coop. Sur.).

CLOVER LEAF WEEVIL (*Hypera punctata*) - UTAH - Occasional adult noted at Logan, Cache County. (Knowlton).

BEAN LEAF BEETLE (*Cerotoma trifurcata*) - ALABAMA - Recent examinations of surface trash near soybean and cotton fields in Morgan County revealed rather high numbers of adults of this species and an occasional *Epilachna varivestis* (Mexican bean beetle). Emergence from hibernation should occur soon where first food is usually beans and peas in home gardens. (McQueen).

ALFALFA CATERPILLAR (*Colias eurytheme*) - ALABAMA - Adults plentiful and laying eggs in clover in central area. (Granberry et al.).

TWO-SPOTTED SPIDER MITE (*Tetranychus telarius*) - ARIZONA - Heavy on patches of field bindweed in fields in areas of Yuma County. Heavy infestations found in scattered areas of fields of alfalfa near Buckeye, Maricopa County. (Ariz. Coop. Sur.).

## FRUIT INSECTS

APPLE APHID (*Aphis pomi*) - MARYLAND - Heavy egg numbers noted on apples; hatching underway at Fairland, Montgomery County, March 25. (U. Md., Ent. Dept.).

GREEN PEACH APHID (*Myzus persicae*) - COLORADO - Egg survey complete on peaches in Mesa County; numbers high in all orchards where counts made. Ranged 50-150 eggs per 100 fruit buds. Approximately 25 percent of eggs hatched. Dormant sprays urged when weather is favorable. (Bulla). ARIZONA - Light on citrus in Yuma County; infestations appear general over much of the citrus-producing areas. (Ariz. Coop. Sur.).

WOOLLY APPLE APHID (*Eriosoma lanigerum*) - ALABAMA - Extremely heavy infestation on apple tree in Tuscaloosa County; feeding in scarred bark areas above ground. (Holstun, Granberry, et al.).

SAN JOSE SCALE (*Aspidiotus perniciosus*) - UTAH - Damaging apple orchard south of Slaterville, Weber County. (Knowlton).

OLIVE SCALE (*Parlatoria oleae*) - CALIFORNIA - Heavy on pear trees in Princeton, Colusa County, and medium on peach in Oroville, Butte County. Heavy on almond trees in Bakersfield, Kern County. (Cal. Coop. Rpt.).

WALNUT SCALE (*Aspidiotus juglansregiae*) - CALIFORNIA - Heavy on English walnut trees in Glenn County. This is a new county record. (Cal. Coop. Rpt.).

ITALIAN PEAR SCALE (*Epidiaspis piricola*) - CALIFORNIA - Heavy on English walnuts locally in San Jose, Santa Clara County. (Cal. Coop. Rpt.).

AN ARMORED SCALE (*Aspidiotus lataniae*) - FLORIDA - Adults ranged 1-2 per twig on pecan at Monticello, Jefferson County. (Phillips, Mar. 18).

CALIFORNIA RED SCALE (*Aonidiella aurantii*) - CALIFORNIA - Heavy on lemon in Grimes, Colusa County. (Cal. Coop. Rpt.).

CITRUS THRIPS (*Scirtothrips citri*) - ARIZONA - Continues light on citrus in Yuma and Maricopa Counties; preventive control methods underway in many areas. (Ariz. Coop. Sur.).

EUROPEAN RED MITE (*Panonychus ulmi*) - MARYLAND - Eggs common on apple trees at Fairland, Montgomery County, March 25. (U. Md., Ent. Dept.).

AN ERIOPHYID MITE (*Eriophyes insidiosus*) - CALIFORNIA - Survey for this vector of peach mosaic in San Joaquin Valley revealed infestations on flowering peach trees in Tulare, Kern and Fresno Counties. This is the first occurrence of this mite north of the Tehachapi Mountains. (Thompson). These are new county records. (PPC).

## TRUCK CROP INSECTS

VEGETABLE WEEVIL (*Listroderes costirostris obliquus*) - CALIFORNIA - Pupae heavy on leaves of beets and turnips and in soil in El Cajon, San Diego County. (Cal. Coop. Rpt.).

CABBAGE LOOPER (*Trichoplusia ni*) - ARIZONA - New generation found in lettuce and cantaloup fields in Yuma County; remains light on vegetables in Maricopa County. (Ariz. Coop. Sur.).

IMPORTED CABBAGEWORM (*Pieris rapae*) - ALABAMA - Adults quite plentiful in Tuscaloosa, Dallas, Autauga, Elmore, Macon and Lee Counties; egg laying noted in home gardens. (Granberry et al.).

CUTWORMS - OKLAHOMA - Unspecified species damaging young onion plants throughout Washita County. (Okla. Coop. Sur.).

MELON APHID (*Aphis gossypii*) - ARIZONA - Increasing rapidly in lettuce and cantaloup fields in Yuma and Maricopa Counties. Controls necessary in many fields. (Ariz. Coop. Sur.).

POPLAR PETIOLE GALL APHID (*Pemphigus populitransversus*) - TEXAS - Locally heavy on turnip roots in Brazoria County. (Teetes).

GREEN PEACH APHID (*Myzus persicae*) - TEXAS - Aphids, probably this species, locally heavy on spinach in Brazoria County. (Teetes).

*Sticky Board Traps in Yuma County, Arizona* - Comparison of average populations of 1964 with 1965: *Aphis gossypii* (melon aphid) 22.5 in 1964 and 30.1 in 1965; *Myzus persicae* (green peach aphid) 4.0 in 1964 and 9.08 in 1965; *Circulifer tenellus* (beet leafhopper) 1.09 in 1964 and 1.08 in 1965. (Ariz. Coop. Sur.).

THRIPS - ARIZONA - Frankliniella spp. moderate and causing some damage to lettuce crop in Yuma and Maricopa Counties. (Ariz. Coop. Sur.). NEVADA - Thrips tabaci (onion thrips) heavy in weedy and untreated onion fields in Moapa Valley, Clark County; populations low in other fields. (Zoller).

SPIDER MITES (Tetranychus spp.) - ARIZONA - Increasing and beginning to damage cantaloups in Yuma County. (Ariz. Coop. Sur.).

## Beet Leafhopper Survey, Texas and New Mexico - 1965

The beet leafhopper (Circulifer tenellus) survey was begun February 24 and completed March 9, 1965. The survey was conducted in 45 counties in Texas and 7 counties in New Mexico, with 92 stops being made in Texas and 19 stops in New Mexico. Host plants were present at 96 percent of the stops in Texas and 74 percent of stops in New Mexico. The number of beet leafhoppers per 100 square feet was 11 in Texas and 14 in New Mexico. Population counts in Texas were the same as in 1964, but host plants were more lush, abundant and widespread during the 1965 survey. Population counts in New Mexico were lower than in 1964, with host plants being more abundant and widespread in 1965.

In order that the survey information be more specific, the following breakdown is presented.

TEXAS - El Paso-Crystal City-Monahans Area - This area produced approximately 75 percent of the beet leafhoppers found on the entire survey in 1965. Heaviest concentration was in the El Paso valley. Compared with 1964, distribution of leafhoppers from Crystal City to the El Paso valley was more uniform this year, populations in the Pecos area were about the same, and counts from Sonora to Uvalde were less.

Seminole-Hereford-Abilene Area - Counts in this area were far below those of 1964. Beet leafhoppers were found at only 3 of the 23 stops made; only 24 specimens were collected, of which 20 were taken at the Dimmitt stop. Beet leafhoppers have been found in relatively high numbers at this particular stop for the past several years. Flixweed is about the only host found in this area at this time of year.

Sonora-Abilene-Monahans Area - This area showed the greatest increase; 86 beet leafhoppers were collected at 6 of the 14 stops made. Only 6 specimens were found in this area in 1964. Host plants were very plentiful, in excellent condition and found at all stops.

NEW MEXICO - El Paso-Las Cruces Area - A total of 50 beet leafhoppers was collected in this area, which is 33 per 100 square feet and represents a slight increase over the number found in 1964.

Las Cruces-Truth or Consequences Area - A total of 48 specimens was collected, which represents 24 per 100 square feet.

Alamogordo-Carrizozo-Hobbs Area - Only 2 beet leafhoppers were taken from the 350 square feet sampled. This is a decrease from the figure for 1964.

Most of the beet leafhopper population in New Mexico was rather evenly distributed from a point just north of El Paso to Truth or Consequences. The general pattern of distribution for the New Mexico area was found to be much the same as in 1964. (PPC and cooperating agencies).

## COTTON INSECTS

PINK BOLLWORM (*Pectinophora gossypiella*) - FLORIDA - Larvae and pupae taken on wild cotton at 2 locations on Long Key, Monroe County. (Creamer, Mar. 17, 18).

## FOREST, ORNAMENTAL AND SHADE TREE INSECTS

SOUTHERN PINE BEETLE (*Dendroctonus frontalis*) - MARYLAND - Heavy and killing considerable number of mature loblolly pines; some salvage cutting necessary in forested section of Somerset and Worcester Counties. (Wood, McComb).

NANTUCKET PINE TIP MOTH (*Rhyacionia frustrana*) - ALABAMA - Emergence from overwintered pupae occurred; adults now ovipositing on new growth. Especially noticeable in Tuscaloosa, Dallas, Autauga and Lee Counties. (Holstun, Granberry, et al.).

PINE NEEDLE SCALE (*Phenacaspis pinifoliae*) - MARYLAND - Heavy on several large white pines near Laurel, Prince Georges County. (U. Md., Ent. Dept.). WISCONSIN - Heavy on ornamental pines in Madison, Dane County, and Oshkosh, Winnebago County; appearance of pines affected and survival of some pines threatened. (Wis. Ins. Sur.).

EASTERN TENT CATERPILLAR (*Malacosoma americanum*) - ALABAMA - Overwintered eggs hatched in central and southern areas; first instars in masses of 50-200 observed feeding on new growth of wild cherry and other trees in Dallas, Autauga, Elmore and Lee Counties. Small webs in crotches of limbs noted; tent building will soon be noticeable. (Granberry et al.).

BAGWORM (*Thyridopteryx ephemeraeformis*) - ALABAMA - Overwintered egg cases numerous in central counties; no hatching observed. (Granberry et al.).

WEEVILS (*Brachyrhinus* spp.) - CALIFORNIA - *B. sulcatus* (black vine weevil) and *B. ovatus* (strawberry weevil) heavy on heather in Inverness, Marin County. (Cal. Coop. Rpt.).

APHIDS - CALIFORNIA - *Myzocallis arundinariae* adults medium on bamboo nursery stock in Arlington, Riverside County; this is a new county record. *Neophyllaphis podocarpi* medium on podocarpus in Richmond, Contra Costa County; this is a new county record. (Cal. Coop. Rpt.). NEVADA - Unspecified species increasing on various ornamentals in Fallon, Churchill County. (York). ALABAMA - *Macrosiphum rosae* (rose aphid) increased tremendously on roses; stem mothers now depositing living young at rapid rate. (McQueen).

CONIFER APHIDS (*Cinara* spp.) - CALIFORNIA - *C. thujafilina* nymphs and adults heavy on *Thuja* spp. in Fresno, Fresno County. Adults of *C. coloradensis* heavy on *Picea abies* nursery stock in Suisun City, Solano County. Nymphs and adults of *C. sibiricae* heavy on juniper in Watsonville, Santa Cruz County. (Cal. Coop. Rpt.).

CALIFORNIA RED SCALE (*Aonidiella aurantii*) - CALIFORNIA - Locally heavy on camphor trees in Marysville, Yuba County. (Cal. Coop. Rpt.).

COCCIDS - MARYLAND - *Pseudaulacaspis pentagona* (white peach scale) heavy on lilac and privet at Hyattsville and infested flowering cherry at University Hills, Prince Georges County. (U. Md., Ent. Dept.). NORTH CAROLINA - *Ceroplastes* sp. heavy on camellia in Northampton County. (Harris, Mount). FLORIDA - *Ceroplastes cirripediformis* (barnacle scale) moderate on stem of Philippine-tea (*Ehretia microphylla*) in nursery at Miami, Dade County. (Herrmann, Mar. 17). Adults and eggs of *Ischnaspis longirostris* (black thread scale) on one *Combretum fruticosum* plant in nursery in Fort Lauderdale, Broward County. (Clinton, Mar. 18). These are new host records for Florida Division of Plant Industry. (Fla. Coop. Sur.). All stages of *Pseudococcus adonidum* (long-tailed mealybug) severe on stem of *Anthurium* sp. in nursery at Tallahassee, Leon County. (Miller, Mar. 15). CALIFORNIA - *Pulvinaria floccifera* heavy on *Pittosporum tobira* locally in Menlo Park, San Mateo County. *Lecanium* sp., probably *L. fletcheri* (Fletcher scale), heavy on *Taxus buccata* var. *stricta* nursery stock in Suisun City, Solano County; some parasitism evident. *Rhizoecus leucosomus* medium on *Senecio mikaniodes* in campus greenhouse at Davis, Yolo County. *Phenacoccus nonarius* occurring on *Franseria dumosa* near Seeley, Imperial County. This is a new county record; it has been recorded from Inyo and San Bernardino Counties. (Cal. Coop. Rpt.).

CITRUS RED MITE (*Panonychus citri*) - CALIFORNIA - Nymphs and adults medium on jasmine nursery stock in Riverside, Riverside County. (Cal. Coop. Rpt.).

CYCLAMEN MITE (*Steneotarsonemus pallidus*) - MARYLAND - Moderately injured begonia in greenhouse at Severn, Anne Arundel County. (U. Md., Ent. Dept.).

## INSECTS AFFECTING MAN AND ANIMALS

### STATUS OF THE SCREW-WORM (*Cochliomyia hominivorax*) IN THE SOUTHWEST

For the first time in 1965, the total accumulation of screw-worm cases has fallen behind the 1964 accumulation. No cases have been reported in the Southwestern Eradication Area since the case reported in Live Oak County, Texas, on January 29. Nor have any cases been reported in any other States since the latter part of 1964. The Republic of Mexico, however, reported 54 cases during the period March 21 - 27: Sonora 37, Durango 2, Puebla 3, Chihuahua 1, Tamaulipas 5, San Luis Potosi 1, Veracruz 1. Sterile screw-worm flies released: 166,250 over Texas rivers; 75,795,200 in grid patterns over Mexico.

| | Positive Cases | | Negative Cases | | Ratio of Positive Cases to 100 Cases Negative | |
|---|---|---|---|---|---|---|
| Year | Current | Cumulative | Current | Cumulative | Current | Cumulative |
| Table 1. | Comparison of specimens reported during corresponding weeks in 1963 and 1964 in Southwestern Eradication Area. | | | | | |
| 1963 | 13 | 182 | 224 | 558 | 5.80 | 32.61 |
| 1964 | 4 | 7 | 204 | 701 | 1.96 | 0.99 |
| 1965 | 0 | 4 | 37 | 570 | 0.00 | 0.70 |
| Table 2. | Comparison of specimens reported during corresponding weeks and in a corresponding area in 1964 in the United States-Mexico Barrier Zone.* | | | | | |
| 1964 | 15 | 160 | 33 | 194 | 45.45 | 82.47 |
| 1965 | 43 | 515 | 31 | 333 | 138.70 | 154.65 |
| Table 2A. | Mexican portion of Barrier Zone only. | | | | | |
| 1964 | 11 | 151 | 2 | 51 | 550.00 | 296.07 |
| 1965 | 43 | 513 | 20 | 205 | 215.00 | 250.24 |

* Barrier Zone - Area in which screw-worm eradication operations are being carried out in an effort to prevent establishment of self-sustaining screw-worm population in the United States.

(Anim. Dis. Erad. Div.).

CATTLE GRUBS (Hypoderma spp.) - SOUTH CAROLINA - Treatment of cattle urged; grubs numerous this winter in Piedmont district. (Nettles et al., Mar. 23). OKLAHOMA - H. lineatum (common cattle grub) light in Bryan County and absent in Payne County; adults present in large numbers in Pushmataha County. (Okla. Coop. Sur.). SOUTH DAKOTA - Endemic populations of H. bovis (northern cattle grub) noted in one- and two-year-old cattle at Cottonwood, Jackson County; Buffalo, Harding County; and Sturgis, Meade County. Numbers of H. bovis on animals in these locations similar to previous years. Cattle grubs on untreated cattle at Lake Andes not nearly so severe this year as in 1964. (Wrich).

CATTLE LICE - SOUTH CAROLINA - Producers urged to treat; lice heavy this winter in Piedmont district. (Nettles et al., Mar. 23.). ALABAMA - Biting and sucking species quite heavy this winter; noticeable increase in activity in Bibb, Bullock and Madison Counties. Weather conditions causing delays in control efforts. (Holla, Odom, Stone). ARKANSAS - Various species continue light in northwest area. (Ark. Ins. Sur.). OKLAHOMA - Heavy on cattle in Pushmataha and Bryan Counties. (Okla. Coop. Sur.). SOUTH DAKOTA - Several species, primarily Bovicola bovis (cattle biting louse), troublesome on herd bulls and older cows in winter pasture in various areas. Infested animals not treated last fall. Higher populations found on cattle at Lake Andes, Charles Mix County; Philip, Haakon County; Buffalo, Harding County; and in Brookings County. Populations lighter on animals examined in Centerville area, Turner County. (Wrich). UTAH - Sucking species heavy on some herds of cattle at Huntsville, Weber County. (Knowlton).

HOG LOUSE (Haematopinus suis) - UTAH - Moderately numberous on hogs near Ogden, Weber County. (Knowlton).

WASPS - ALABAMA - Overwintered females left hibernation; scouting for food and nest building. Noticeable around homes, on shrubs; several stings reported. (McQueen). UTAH - Very troublesome to humans at Park City, Summit County. (Knowlton).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - ARKANSAS - Continues moderate to heavy in northwest area. (Ark. Ins. Sur.).

LONE STAR TICK (Amblyomma americanum) - OKLAHOMA - Moderate (25 per head) on cattle in Pushmataha County. (Okla. Coop. Sur.). ARKANSAS - Nuisance to people walking in timbered areas in northwest area. (Ark. Ins. Sur.).

WINTER TICK (Dermacentor albipictus) - CALIFORNIA - Heavy in brush areas in Loyalton, Plumas County. (Cal. Coop. Rpt.).

## HOUSEHOLD AND STRUCTURAL INSECTS

BOXELDER BUG (Leptocoris trivittatus) - MINNESOTA - Increased activity on warmer days noted. (Minn. Ins. Rpt.). NEW MEXICO - Light to very abundant in and around homes with boxelder trees in Santa Fe County; very annoying to homeowners. (N.M. Coop. Rpt.).

CLOVER MITE (Bryobia praetiosa) - MARYLAND - Migrated into homes in several communities in Prince Georges County. (U. Md., Ent. Dept.). NEW MEXICO - Bryobia sp. entering homes in Farmington-Aztec area, San Juan County, and Sante Fe, Santa Fe County. (N.M. Coop. Rpt.). UTAH - Invading homes in several Weber County communities; additional infestations noted in Ogden. Heavy and invading homes at Smithfield, Cache County. (Knowlton).

INDIAN-MEAL MOTH (Plodia interpunctella) - MARYLAND - Adults noted throughout home in Frederick, Frederick County. (U. Md., Ent. Dept.).

ELM LEAF BEETLE (Galerucella xanthomelaena) - MARYLAND - Adults caused nuisance in building at Annapolis, Anne Arundel County. (U. Md., Ent. Dept.).

RED-HEADED ASH BORER (*Neoclytus acuminatus*) - NORTH CAROLINA - Adults nuisance in home in Cherokee County; det. by D. A. Mount. (Stewart).

COCKROACHES - MINNESOTA - Infested 500-unit apartment complex in Minneapolis-St. Paul suburb; required extensive controls. (Minn. Ins. Rpt.).

SAW-TOOTHED GRAIN BEETLE (*Oryzaephilus surinamensis*) - DELAWARE - Continues rather numerous in homes in several areas of State. (Burbutis). NORTH CAROLINA - Adults infested oatmeal locally in Edgecombe County. (Powell, Mount).

ANTS - DELAWARE - Large numbers of *Camponotus pennsylvanicus* (black carpenter ant) in home in New Castle County. (MacCreary). OKLAHOMA - *Crematogaster laeviuscula* reproductives swarming in home in Oklahoma County and *Crematogaster* sp. swarming in home in Logan County. *Monomorium minimum* (little black ant) workers infested home in Kay County. (Okla. Coop. Sur.). CALIFORNIA - Adults of *Tapinoma sessile* (odorous house ant) heavy in home in Ukiah, Mendocino County. (Cal. Coop. Rpt.).

SUBTERRANEAN TERMITES (*Reticulitermes* spp.) - MARYLAND - Swarming occurred around and in buildings at several locations in Prince Georges County. (U. Md., Ent. Dept.). OKLAHOMA - Winged adults swarming in 2 locations in Oklahoma City, Oklahoma County. (Okla. Coop. Sur.). NORTH CAROLINA - *R. flavipes* (eastern subterranean termite) swarmed in Haywood County home March 22; in home in Wake County March 25; and in home in Alamance County March 16. (Holloway, Wray, Mount). UTAH - *R. hesperus* (western subterranean termite) damaged home and garage at Ogden, Weber County. (Knowlton).

SOUTHERN LYCTUS BEETLE (*Lyctus planicollis*) - CALIFORNIA - Infesting hardwood floors in home in Rancho Cordova, Sacramento County. (Cal. Coop. Rpt.).

## BENEFICIAL INSECTS

A PREDACEOUS STINK BUG (*Perillus splendidus*) - COLORADO - Overwintered active adult taken on campus at Fort Collins, Larimer County, March 23 after 62° F. spring day. (Thatcher).

## MISCELLANEOUS INSECTS

THRIPS - ALABAMA - Overwintered adults present on most low growing grasses, legumes and weeds, especially on field borders. Large numbers appear ready to migrate to corn, cotton and other crops following planting. (McQueen).

WHITE-FRINGED BEETLES (*Graphognathus* spp.) - NORTH CAROLNNA - Larvae collected for the first time in Alexander County; surveys in Bladen, Harnett, Hoke, Robeson and Scotland Counties negative. (PPC South. Reg., Feb. Rpt.).

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) - FLORIDA - Adults taken in soil in Wakulla County, March 17 (Johnson); and in soil at Lawtey, Bradford County, March 18 (Josey). These are new county records. (Fla. Coop. Sur.). Adults taken in soil at Cassia and Crows Bluff, Lake County. (Mosteller, Mar. 22). These are extensions in infested counties. (PPC). Found for the first time in Sumter County in February. (PPC South. Reg.). GEORGIA - Found for the first time in Brooks, Evans and Tattnall Counties. (PPC South. Reg., Feb. Rpt.). MISSISSIPPI - Found for the first time in Claiborne County. (PPC South. Reg., Feb. Rpt.). SOUTH CAROLINA - Found for the first time in Hampton County. (PPC South. Reg., Feb. Rpt.).

SPRINGTAILS - MICHIGAN - Undetermined species causing concern in several Lower Peninsula counties. (Janes). OKLAHOMA - *Entomobrya* sp. reported living in well and entering water supply of home in Carter County. (Okla. Coop. Sur.).

## LIGHT TRAP COLLECTIONS

| | Temperature °F. | Precipitation (inches) | Type of trap * | *Agrotis ipsilon* (black cutworm) | *Carpocapsa pomonella* (codling moth) | *Chorizagrotis auxiliaris* (army cutworm) | *Estigmene acrea* (salt-marsh caterpillar) | *Faronta diffusa* (wheat head armyworm) | *Feltia subterranea* (granulate cutworm) | *Heliothis virescens* (tobacco budworm) | *H. zea* (bollworm, corn earworm, tomato fruitworm) | *Loxostege commixtalis* (alfalfa webworm) | *Loxostege similalis* (garden webworm) | *Loxostege sticticalis* (beet webworm) | *Ostrinia nubilalis* (European corn borer) | *Peridroma saucia* (variegated cutworm) | *Prodenia ornithogalli* (yellow-striped armyworm) | *Protoparce quinquemaculata* (tomato hornworm) | *Protoparce sexta* (tomato hornworm) | *Pseudaletia unipuncta* (armyworm) | *Spodoptera exigua* (beet armyworm) | *Spodoptera frugiperda* (fall armyworm) | *Trichoplusia ni* (cabbage looper) | Crops ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLORIDA | | | | | | | | | | | | | | | | | | | | | | | | |
| Gainesville 3/22 | | | BL | 1 | | | | | 7 | | | | | | | | | | | | | | | |
| GEORGIA | | | | | | | | | | | | | | | | | | | | | | | | |
| Tifton 3/18-24 | 29-81 | 2.3 | BL | | | | | | | 0 | 1 | | | | | | | 0 | 0 | | | | | |
| SOUTH CAROLINA | | | | | | | | | | | | | | | | | | | | | | | | |
| Charleston 3/22-28 | 31-80 | 2.09 | BL | 3 | | | 0 | | 4 | 0 | 1 | | | | | 0 | 6 | 0 | 0 | 21 | | 3 | 0 | |
| TEXAS | | | | | | | | | | | | | | | | | | | | | | | | |
| Brownsville 3/18-23 | 44-84 | Trace | 5BL | 62 | | | 5 | | 832 | 6 | 85 | | 4 | | | 32 | 1 | | 4 | 39 | | 84 | 50 | |
| Waco 3/20-26 | | | BL | 3 | | | 5 | | 0 | | 0 | | | | | 25 | 5 | | | 30 | 0 | 0 | 0 | |

* BL = blacklight; I = incandescent; MV = mercury vapor; O = other

** alf. = alfalfa; beet = garden beet and/or sugar beet; cole = cole crops (crucifers); cott. = cotton; FC = field corn; grain = small grains; leg. = legumes (unspecified); lett. = lettuce; pean. = peanut; pepp. = pepper; pot. = potatoes; SC = sweet corn; sol. = solanaceous plants (unspecified); soy. = soybean; TC = truck crops (unspecified or mixed); tob. = tobacco; tom. = tomato.

# ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN South Carolina (State or District) DURING 1964 (Year)

ATTACKING Corn (Commodity or Crop)

A. Pest or pest complex: Corn earworm, rice weevil

B. Number of acres [a] produced (From CRS) No. 515,000

C. Average yield per acre [a] (From CRS) Units/ 47 bu.

D. Price[b] per unit ( bu. )[c] (From CRS) $/ 1.26

E. Acres [a] needing control No. 515,000

F. Acres [a] treated No. 0

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 4.8

I. Loss in yield, units per acre [a], C x H Units/ 2.26 bu.

J. Loss in yield, $ per acre [a], D x I $/ 2.85

K. Loss in quality, $ per ---- [a] $/ ----

L. Yield loss for all acres [a], (E-F) x I Units 1,163,900 bu.

M. Control cost, $ per ---- [a], $/ ----

N. Control cost for all ---- [a], F x M $ ----

O. Yield loss for all acres [a], (E-F) x J $ 1,467,750

P. Quality loss for all ---- [a], (E-F) x K $ ----

Q. Combined control cost and losses, N + O + P $ ----

R. Percent loss due to each insect in the complex: Earworm 4.3 and rice weevil 0.5

Comment:

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by V. M. Kirk

Date January 4, 1965

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ATTACKING Soybeans (Commodity or Crop)

A. Pest or pest complex: Velvetbean caterpillar, corn earworm, loopers, stink bugs green cloverworm, Mexican bean beetle

B. Number of acres [a] produced (From CRS) No. 746,000

C. Average yield per acre [a] (From CRS) Units/ 23 bu.

D. Price[b] per unit ( bu. )[c] (From CRS) $/ 2.55

E. Acres [a] needing control No. 186,000

F. Acres [a] treated No. 297,600

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 4

I. Loss in yield, units per acre [a], C x H Units/ .92

J. Loss in yield, $ per acre [a], D x I $/ 2.35

K. Loss in quality, $ per ---- [a] $/ ----

L. Yield loss for all acres [a], (E-F) x I Units 171,120 bu.

M. Control cost, $ per acre [a], $/ 3.00

N. Control cost for all acres [a], F x M $ 892,800

O. Yield loss for all acres [a], (E-F) x J $ 437,100

P. Quality loss for all ---- [a], (E-F) x K $ ----

Q. Combined control cost and losses, N + O + P $ 1,329,900

R. Percent loss due to each insect in the complex:

Comment: This represents a unique crop and insect situation. According to the latest research, more acres are being treated than needed.

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by S. A. Turnipseed

Date January 4, 1965

ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN South Carolina (State or District) DURING 1964 (Year)

ATTACKING Tobacco (Commodity or Crop)

A. Pest or pest complex: Hornworms, flea beetles, budworms, wireworms and other insects

B. Number of acres[a] produced (From CRS) No. 72,000

C. Average yield per acre[a] (From CRS) Units/ 2,200 lb.

D. Price[b] per unit ( lb. )[c] (From CRS) $/ .60

E. Acres[a] needing control No. 72,000

F. Acres[a] treated and/or inadequate treatment No. 72,000

G. Reduction due to not treating and/or inadequate treatment where needed

H. Loss in yield, and quality percent in plant bed & field % yield 5, quality 5

I. Loss in yield, units per acre[a], C x H Units/ 110 lb.

J. Loss in yield, $ per acre[a], D x I $/ 66.00

K. Loss in quality, $ per acre[a] $/ 66.00

L. Yield loss for all acres[a], (E-F) x I Units 7,920,000 lb.

M. Control cost, $ per acre[a], $/ 16.59

N. Control cost for all acres[a], F x M $ 1,194,480.00

O. Yield loss for all acres[a], (E-F) x J $ 4,752,000.00

P. Quality loss for all acres[a], (E-F) x K $ 4,752,000.00

Q. Combined control cost and losses, N + O + P $ 10,698,480.00

R. Percent loss due to each insect in the complex:

Comment: Does not include nematodes.

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by D. A. Benton

Date January 4, 1965

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ATTACKING Cotton (Commodity or Crop)

A. Pest or pest complex: Boll weevil, bollworm, thrips, aphids, mites, miscellaneous (nematodes, wireworms and others)

B. Number of acres[a] produced (From CRS) No. 538,000

C. Average yield per acre[a] (From CRS) Units/ 508 lb.

D. Price[b] per unit ( lb. )[c] (From CRS) $/ 0.31

E. Acres[a] needing control No. - 530,000

F. Acres[a] treated No. 470,000

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 60

I. Loss in yield, units per acre[a], C x H Units/ 305 lb.

J. Loss in yield, $ per acre[a], D x I $/ 94.55

K. Loss in quality, $ per acre[a] $/ 10.00

L. Yield loss for all acres[a], (E-F) x I Units 18,300,000 lb.

M. Control cost, $ per acre[a], $/ 30.00

N. Control cost for all acres[a], F x M $ 14,100,000

O. Yield loss for all acres[a], (E-F) x J $ 5,673,000

P. Quality loss for all acres[a], (E-F) x K $ 600,000

Q. Combined control cost and losses, N + O + P $ 20,373,000

R. Percent loss due to each insect in the complex: Boll weevil 45, bollworm 35, thrips 5, aphids 5, mites 5, miscellaneous (nematodes, wireworms and others) 5

Comment:

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by L. M. Sparks

Date January 4, 1965

# ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN Arizona (State or District) DURING 1964 (Year)

ATTACKING Alfalfa (seed) (Commodity or Crop)

A. Pest or pest complex: Cutworms, leafhoppers, lygus bugs, aphids, mites, alfalfa weevil

B. Number of acres[a] produced (From CRS) No. 18,000

C. Average yield per acre[a] (From CRS) Units/ 185 lb.

D. Price[b] per unit ( lb. )[c] (From CRS) $/ .28

E. Acres[a] needing control No. 18,000

F. Acres[a] treated No. 14,000

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 20

I. Loss in yield, units per acre[a], C x H Units/ 37 lb.

J. Loss in yield, $ per acre[a], D x I $/ 10.36

K. Loss in quality, $ per ----[a] $/ ----

L. Yield loss for all acres[a], (E-F) x I Units 148,000 lb.

M. Control cost, $ per acre[a], $/ 3.50

N. Control cost for all acres[a], F x M $ 49,000

O. Yield loss for all acres[a], (E-F) x J $ 41,440

P. Quality loss for all ----[a], (E-F) x K $ ----

Q. Combined control cost and losses, N + O + P $ 90,440

R. Percent loss due to each insect in the complex:

Comment: Estimated savings - $145,040

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by Dale Fullerton

Date March 9, 1965

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ATTACKING Alfalfa (hay) (Commodity or Crop)

A. Pest or pest complex: Leafhoppers, webworms, three-cornered alfalfa hopper, alfalfa weevil, aphids, cutworms, alfalfa caterpillar

B. Number of acres[a] produced (From CRS) No. 201,000

C. Average yield per acre[a] (From CRS) Units/ 4.70 tons

D. Price[b] per unit ( ton )[c] (From CRS) $/ 15.00

E. Acres[a] needing control No. 175,000

F. Acres[a] treated No. 90,000

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 15

I. Loss in yield, units per acre[a], C x H Units/ .70 ton

J. Loss in yield, $ per acre[a], D x I $/ 10.50

K. Loss in quality, $ per ----[a] $/ ----

L. Yield loss for all acres[a], (E-F) x I Units 59,500 tons

M. Control cost, $ per acre[a], $/ 3.50

N. Control cost for all acres[a], F x M $ 315,000

O. Yield loss for all acres[a], (E-F) x J $ 892,500

P. Quality loss for all ----[a], (E-F) x K $ ----

Q. Combined control cost and losses, N + O + P $ 1,207,500

R. Percent loss due to each insect in the complex:

Comment: Estimated savings - $945,000

a. Acres, head of cattle or other producing units used by Crop Reporting Service.

b. Season average price per unit as given by CRS (describe basis).

c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).

Submitted by Dale Fullerton

Date March 9, 1965

## SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1964

(continued from page 272)

### TOBACCO INSECTS

Highlights:

HORNWORMS and BUDWORMS were not particular problems on tobacco during the 1964 season. CABBAGE LOOPER caused some damage to tobacco in North Carolina throughout the season, and was considered a distinct problem on flue-cured tobacco in Florida for the first time. This pest also caused heavy losses to shade-grown tobacco in Florida during the spring. BEET ARMYWORM is apparently becoming a major pest of shade-grown tobacco in Florida, where approximately 150 acres were damaged this season. TOBACCO FLEA BEETLE was moderate to heavy on tobacco in the field in Georgia and was more prevalent in North Carolina. This pest was generally heavy on newly set tobacco in all sections of Maryland. TOBACCO WIREWORM caused more damage to tobacco transplants in North Carolina this season than in 1963, and infestations ranged light to heavy on this crop in Georgia. Insect losses to the shade-grown tobacco crop in Florida during the 1964 season amounted to $1,053,897.

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TOBACCO HORNWORM (Protoparce sexta) continued at approximately the same level of infestation on flue-cured tobacco in FLORIDA as in former years, but there were some indications that infestations may have been lighter than usual. This pest caused no damage to shade-grown tobacco in the State during 1964. First hornworm moths were trapped April 26, 1964, as compared with April 22, 1963. Trap catches in Florida showed 4.3 percent fewer hornworm moths caught in 1964. Tobacco hornworm was one of the major pests of the small tobacco crop in ALABAMA this season. TOMATO HORNWORM (P. quinquemaculata) adults began appearing during mid-June in WISCONSIN. Counts were relatively high in blacklight traps as later reflected by larval feeding on tobacco during late July.

HORNWORMS (Protoparce spp.) were considerably below normal on tobacco in MARYLAND throughout the 1964 season, and were very light on tobacco in VIRGINIA where infestations were observed. Hornworm infestations in NORTH CAROLINA were generally low and sporadic throughout the season, the only serious infestation occurring during the last week of July. Infestations of these pests in GEORGIA were light on tobacco this season.

TOBACCO BUDWORM (Heliothis virescens) infestations on flue-cured tobacco in FLORIDA were at about the same level as in previous years,with some indications that numbers may have been lighter than usual. Populations of this budworm on shade-grown tobacco in Florida were small and only light damage occurred to this crop in 1964. Tobacco budworm was one of the major pests of tobacco in ALABAMA this year, where the crop is confined to very few counties and consists of approximately 500 acres. In GEORGIA, tobacco budworm infestations on tobacco ranged moderate to heavy, and infestations of CORN EARWORM (H. zea) were heavy, especially during mid and late season. Tobacco budworm was generally very light on tobacco in Pittsylvania County, VIRGINIA, in 1964.

BUDWORMS (Heliothis spp.) were again below normal in numbers on tobacco in MARYLAND, with only a few light infestations being observed. Populations in NORTH CAROLINA were very light on tobacco throughout the 1964 season. Infestations on research stations at Reidsville, Rockingham County, at Clayton, Johnston County, and at Whiteville, Columbus County, were very low on tobacco.

CABBAGE LOOPER (Trichoplusia ni) damaged small tobacco plants in Onslow County, NORTH CAROLINA, during the third week of May. This is earlier than usual. There were scattered reports of damage by this pest to tobacco throughout the 1964 season in North Carolina, most coming from Carteret, Onslow and Columbus Counties. Cabbage looper was considered a distinct problem on flue-cured tobacco for the first time in FLORIDA this season. This looper was a problem on tobacco that had been set in the fields for about 6 weeks and there were requests for assistance throughout the growing season. Cabbage looper caused heavy losses to shade-grown tobacco in Florida in early spring, and was the number one pest of this crop in the State during 1964. The seasonal abundance of this noctuid was four times greater than in 1963.

CUTWORMS, especially BLACK CUTWORM (Agrotis ipsilon), caused conspicuous damage to newly set tobacco plants in several fields over a wide area in MARYLAND. Cutworms also caused injury to several tobacco beds in Charles County, Maryland. Agrotis spp. caused heavy losses in several fields of shade-grown tobacco in FLORIDA, and infestations were more numerous than in 1963. GRANULATE CUTWORM (Feltia subterranea) was observed feeding on bottom leaves of tobacco in several fields and BEET ARMYWORM (Spodoptera exigua) was noted on tobacco in several areas of GEORGIA during the 1964 season. Beet armyworm is apparently becoming a major pest of shade-grown tobacco in FLORIDA as approximately 150 acres of this crop showed damage during the 1964 season.

POTATO TUBERWORM (Gnorimoschema operculellum) continued to be unpredictable on flue-cured tobacco in FLORIDA during the 1964 season, with no complaints concerning this pest being received. In 1963, isolated severe infestations on flue-cured tobacco were reported in Alachua and Columbia Counties, and during 1962 complaints concerning this pest were received from Gilchrist and Lafayette Counties. Light infestations of potato tuberworm were found in several fields of shade-grown tobacco in Florida during the 1964 season, but damage was of minor importance.

TOBACCO FLEA BEETLE (Epitrix hirtipennis) caused moderate damage to some plant beds of shade-grown tobacco in FLORIDA during 1964, and was effectively controlled in other plant beds with the application of insecticides. Plant beds not properly treated suffered heavier losses. The overwintering population was larger than in 1963. Dry weather during May retarded emergence and adult populations of the first and second broods were slightly smaller in 1964. Damage by tobacco flea beetle on shade tobacco was held in check by increased grower vigilance and the proper application of insecticides. Tobacco flea beetle infestations in GEORGIA ranged light to moderate in the plant bed, but most infestations on tobacco in the field were moderate to heavy during the 1964 season. There appeared to be two periods of heavy infestation in Georgia; first, shortly after transplanting, and second, soon after cropping begins. Tobacco flea beetle was more prevalent throughout the 1964 season in NORTH CAROLINA than usual; however, the pest was not a very serious problem this year. Light to medium infestations of this leaf beetle appeared on tobacco in Pittsylvania County, VIRGINIA, during 1964. Tobacco flea beetle was not an important pest of tobacco in the bed during 1964 in MARYLAND, but populations were generally heavy on newly set tobacco in all sections of the State, especially during May and June, while infestations during July and August ranged light to moderate. Unspecified FLEA BEETLES were pests of tobacco in ALABAMA this year.

TOBACCO WIREWORM (Conoderus vespertinus) and SOUTHERN POTATO WIREWORM (C. falli) caused more damage to tobacco transplants in NORTH CAROLINA during 1964 than in 1963, but not so much damage as in 1962. Resetting of tobacco plants was necessary in some fields during 1964. First report of damage to tobacco by these pests this season was on a 4-acre field in Robeson County on April 27, where 92 percent of the plants was damaged. Larvae of southern potato wireworm have now been found in North Carolina in Columbus, Pender, Onslow, Carteret, Craven and Pamlico Counties, and in the southern portions of Jones, Duplin and Sampson Counties. Infestations of tobacco wireworm ranged light to heavy on tobacco in GEORGIA during the 1964 season, with most infestations being moderate in nature. In FLORIDA, populations of Conoderus spp. caused losses of 20-40 percent of the stand of shade-grown tobacco in several fields where proper insecticides were not applied.

VEGETABLE WEEVIL (Listroderes costirostris obliquus) infestations in tobacco in GEORGIA during the 1964 season were mostly light to moderate.

GREEN PEACH APHID (Myzus persicae) populations were moderate to heavy throughout the tobacco-growing regions of MARYLAND during late July and August. More than 15,000 acres of tobacco were treated to control damaging or developing populations of this pest. Aphids must be controlled to insure high quality Maryland type tobacco. Green peach aphid appeared on tobacco in the field in VIRGINIA during the season, and infestations ranged light to moderate on tobacco in the plant bed and in the field in GEORGIA during 1964. Green peach aphid populations on flue-cured tobacco in FLORIDA continued at about the same level as in former years, but there were some indications that numbers were lower than usual. On shade-grown tobacco in Florida, populations of this aphid were slow in becoming established this season due to cool weather in the early spring, and little loss resulted.

Infestations of SOUTHERN GREEN STINK BUG (Nezara viridula) and BROWN STINK BUG (Euschistus servus) were light on tobacco in GEORGIA during the 1964 season. In VIRGINIA, medium infestations of TOBACCO THRIPS (Frankliniella fusca) were encountered on tobacco in a few locations during the season.

Insect losses to the shade-grown tobacco crop in FLORIDA were approximately 8.8 percent, or $1,053,897, with cabbage looper (3.2 percent), cutworms (3.0 percent), flea beetles (0.8 percent), budworms (0.7 percent) and wireworms (0.2 percent) causing the major portion of the damage. Approximately 0.7 percent was lost because of infestations of armyworms, potato tuberworm and other species. The outlook for infestations of tobacco pests in Florida during 1965 indicates that cabbage looper populations should remain about the same, with some increases indicated should weather conditions be favorable in the spring. Tobacco flea beetle may become the number one pest of tobacco in Florida during 1965 if vigilance and controls are relaxed. The potential of this leaf beetle is still high and the least edge given to this pest may be disastrous to the crop. Cutworms will be a major problem on tobacco in Florida directly following transplanting. Heavier infestations of budworms are anticipated for 1965, depending upon the length of the growing season and weather conditions. Beet armyworm and wireworms will probably continue to cause losses in some fields of tobacco in Florida in 1965, but no serious outbreaks are expected.

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## COTTON INSECTS

### Highlights:

BOLL WEEVIL was again light over a large portion of the Cotton Belt. Infestations were generally light in North Carolina, Tennessee, Georgia, Louisiana, Arkansas and Missouri. Boll weevil has built up to rather high counts throughout Alabama with sufficient numbers having entered hibernation in the fall of 1964 to be of general concern if normal numbers survive the winter. Damage from this pest was extreme in southeastern Alabama. Boll weevil was heavy in several areas of the cotton-growing regions of Oklahoma, and populations appeared above the Cap Rock in Texas for the second consecutive year. BOLLWORMS were severe in Georgia this season as they were in 1963, being more serious than boll weevil in many instances. BOLLWORM was the most damaging pest of cotton in Arizona this season. TARNISHED PLANT BUG populations were extremely heavy on cotton throughout Louisisana. Migrations of LYGUS BUGS to cotton in Arizona were heavy during the early part of the season and damage became heavy in many sections. These bugs reached economic proportions on cotton in Clark and Nye Counties, Nevada, during August, and they were damaging to this crop in all areas of California. TOBACCO THRIPS infestations were unusually high and widespread on cotton in Louisiana. SPIDER MITES were the major cause of control applications in all cotton-growing areas of California during 1964, and caused heavy, localized damage to cotton in

Arizona. Tetranychus cinnabarinus was heavier and more widespread in the Brazos River bottom area of Texas than during 1963. Spider mites were somewhat heavier than in 1963 in Arkansas and were probably the third most economically important problem on cotton in Georgia. These pests were a continuous problem on cotton in Tennessee throughout the 1964 season.

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BOLL WEEVIL (Anthonomus grandis) infestations were generally low in NORTH CAROLINA through the early part of the 1964 season, but some untreated fields in the southeastern part of the State approached 45 percent punctured squares by mid-July. Infestations were generally about 20 percent in untreated cotton in east central counties of North Carolina at that time. Infestations increased rapidly in all areas of the Coastal Plain in the latter part of July and rains hampered control efforts. Weevils caused considerable damage during the remainder of the season in North Carolina, except in the Piedmont where populations were much lower. In the Coastal Plain area, losses of 75-100 pounds of lint per acre were reported due to boll weevil. Boll weevil populations were light most of the season in TENNESSEE. In the southern counties of the State, a few fields of cotton were heavily damaged, but in general, economic populations of this pest did not occur until late in the season when most fields were already mature.

Boll weevil infestations were lower than average in GEORIGA during 1964, but were heavier than in 1963. Rains during the middle and late part of the season were more numerous and general over the State, except in the southeast where conditions were quite dry at times. These rains caused many farmers to get off their regular application schedules, as well as causing cotton to become quite rank. Many farmers ceased needed control applications because they believed that they were tearing up more cotton than would be lost to this pest. Square counts were not made in southern Georgia during the week of June 1 as there were insufficient squares to give accurate counts. Counts made during the week of June 15 ranged 0-65 percent punctured squares with an average of 13 percent. Counts in southern Georgia during mid-August ranged 14-85 percent, with an average of 48 percent punctured squares. Infestations of this nature at this time during the growing season are most unusual. In the northern area of Georgia, first square counts were made during the week of July 6, when percent punctured squares ranged 0-12 and averaged 7. During the week of August 17, counts increased to a range of 8-88 percent and averaged 44 percent punctured squares. During the week of August 31, counts averaged 55 percent punctured squares with a range of 23-80 percent, with squares becoming scarce at that time.

Boll weevil winter hibernation survival surveys were initiated in ALABAMA during March of 1964, samples being collected from 10 farms in each of four widely separated counties from the extreme south to northern part of the State. The average number of live weevils per acre of surface trash near cotton fields were 537 in Henry, 242 in Dallas, 81 in Tuscaloosa and zero in Morgan Counties. Counts of live weevils were made on each of four farms in these same counties in April, May and June, and counts were in the same proportions as survival counts from surface trash in March. Average counts of weevils per acre entering hibernation in surface trash in the fall of 1964 were 2,821 in Henry, 6,650 in Dallas, 7,061 in Tuscaloosa and 1,854 in Morgan Counties. Boll weevil populations have again build up to rather high counts throughout Alabama and sufficient numbers entered hibernation in the fall of 1964 to be of general concern if a normal number survive the winter. This is of major concern in the northern area where most of the State's cotton is grown. Weevil infestations appeared early in Alabama during 1964, with heavy egg laying occurring from Birmingham, Jefferson County, southward. Cotton made excellent growth, affording excellent shade for larvae in squares during June and July, and with favorable moisture conditions, a heavy "hatch-out" of first-generation weevils occurred from late June to mid-July. This condition continued in Alabama through succeeding generations. Extreme damage occurred to cotton in southeastern Alabama because of high weevil populations and unsuitable weather for effective controls. Cotton yields were much less in this area than in 1963. Isolated but very light egg laying occurred in a few areas of north Alabama. An extremely light and scattered first hatch of boll weevil occurred but only light damage resulted from succeeding generations. Although cotton had matured to another record yield before widespread numbers of this weevil developed, most fields showed a high buildup of larvae and young weevils as killing frost appeared in all of northern Alabama in late November. Very few controls were applied in this area of the State during the growing season.

Boll weevil populations were light generally in cotton in LOUISIANA but a few moderately heavy infestations developed in the east central portion of the State in an area receiving frequent rainfall during the cotton-growing season. Boll weevil was very light in cotton in ARKANSAS during 1964 as compared to what is considered to be normal. Infestations were similar to those of 1963, except they were somewhat heavier later in the season. Surveys showed that 0-7 percent of fields surveyed needed treatment, with a season average of 2.8 percent of fields needing controls. Boll weevil infestations were practically nonexistent in MISSOURI during 1964. Infestations of this pest were first noted in OKLAHOMA cotton in late June, and by late August, populations were heavy in several areas of the cotton-growing region, where they remained moderate to heavy through the remainder of the 1964 season. Boll weevil was present in heavy numbers below the Cap Rock in TEXAS, and populations also appeared above the Cap Rock for the second consecutive year. Populations of this cotton pest were also heavy in the red rolling plains and lower Rio Grande areas of Texas this season.

A WEEVIL (Compsus auricephalus) caused some damage to cotton in Obion, Lake and Dyer Counties, TENNESSEE. Another WEEVIL (Anthonomus sp.) was found to be infesting 32,912 acres of cotton on 500 properties in Cochise, Maricopa, Pima, Pinal, Santa Cruz and Yuma Counties, ARIZONA. Surveys of cotton in NEVADA during the 1964 season revealed no weevil infestations of that crop.

DARKLING BEETLES caused considerable damage to some fields of cotton in western TEXAS during the 1964 season, particularly in Garza County.

BOLLWORMS (Heliothis spp.) were generally light in numbers in NORTH CAROLINA during the 1964 season, but some damage did occur to cotton late in the season. It is estimated that 20-25 pounds of lint per acre were lost due to these pests; however, this is a low figure. These pests were not much of a problem on cotton in TENNESSEE this season. There were a great number of complaints concerning insecticide failure, but investigation showed that controls were begun too late in all instances to be effective. In most instances where bollworms were damaging cotton in Tennessee, controls should have been begun two weeks sooner. Infestations of these pests were severe and similar to those of 1963 in GEORGIA. First bollworms in the State were observed during the week of May 4, and during the week of May 18, as many as 10 larvae per 100 terminals were found; however, most infestations remained light until the week of July 6. Infestations in northern and southern portions of Georgia continued heavy until immediately prior to harvest. Bollworms were more serious in Georgia in many instances during 1964 than was boll weevil (Anthonomus grandis). Bollworm adult flights and egg laying in ALABAMA occurred during early April, May and June, but the adult population was not reflected by the numbers of larvae entering pupation in cotton fields. Rather, pupation occurred in and moth flights originated from vetch, crimson clover, corn and many other crops. Treatments for these pests were not generally applied until necessary for boll weevil (Anthonomus grandis), at which time sufficient dosage and spacing of insecticide applications were such as to control both pests. Very little effort was made to control bollworms in the northern tier of counties and very little damage was reported. Heavy bollworm populations developed late throughout Alabama on various crops including late cotton squares, blooms and bolls. Reports indicated that control of this cotton complex was not as difficult as it was prior to 1963 when bollworms were equal to or greater in importance than was boll weevil. This may have resulted from a better knowledge of control methods by growers and less disturbance of the natural control complex brought about in much of the cotton-producing area of the State where no control was necessary for boll weevil and other cotton pests. Infestations of bollworms in LOUISIANA during 1964 were lower than at any time during the last several years.

Bollworms infested a slightly lower percentage of cotton fields in ARKANSAS during 1964 than during 1963, with a season average of 48.7 percent in 1964 compared with a seasonal average of 56.8 percent in 1963 and a 5-year average of 49.9 percent. Moths were active throughout the 1964 season in Arkansas and were especially heavy from late July to the end of the cotton season. This is shown by the records of eggs, larvae and percent damaged cotton squares. A high of 37 percent of fields had more than 10 eggs per 100 terminals the second week in August; the seasonal average was 11 percent. A high of 41 percent of fields had more than 3 larvae per 100 terminals the fourth week in July; the season average was 17 percent. The percent of bollworm damaged squares is a guide to the activity of these pests, with more than 6 percent damaged squares considered the level of serious problems in Arkansas. A high of 13 percent of fields reached this level the fourth week in July; however, the seasonal average for 1964 was only 4.3 percent. Bollworms were the principal pests for which insecticides were applied during the 1964 season in Arkansas. Determination of 2,686 Heliothis spp. larvae during the season did not show any geographical or seasonal trends regarding TOBACCO BUDWORM (H. virescens) in Arkansas. This species comprised 1.49 percent of the Heliothis spp. populations in 1964 compared with 5.9 percent in 1963.

BOLLWORM (H. zea) infestations increased rapidly in MISSOURI the last week in July and increased until mid-August when approximately 76 percent of scouted fields were infested. A survey showed that tobacco budworm made up 1.46 percent of Heliothis spp. population in Missouri during the 1964 season. Bollworms were becoming common in OKLAHOMA as cotton plants began to square in early July. Populations of these pests had increased in irrigated cotton by late July and continued moderate to heavy throughout the season. Infestations of bollworm were generally less severe over TEXAS as a whole than during the 2 previous years. This does not pertain to many locally damaging populations, however. Heavy populations of bollworm were present in the lower Rio Grande Valley, the trans-Pecos, red rolling plains and Brazos River bottom areas of the State this season. Tobacco budworm was also less damaging in Texas than for the past 2 years; however, scattered heavy populations of this pest were damaging in some areas such as the lower Rio Grande Valley.

Infestations of bollworm were much lighter in NEW MEXICO that they were in 1963. Spotted, light to heavy populations did cause some damage to fields of cotton in most southern counties of the State this past season. Bollworm was the most damaging pest of cotton in ARIZONA during the 1964 season. Heavier than normal populations severely damaged cotton in central Arizona during July, August and September. Controls, for the most part, were not always successful. Late season infestations resulted in moderate damage in Graham and Cochise Counties. Infestations in Yuma County, Arizona, were only light, however, due largely to early controls and reductions by predators and parasites. Populations of bollworm began to increase in late July in NEVADA and continued through the first week of September, with many fields requiring treatment in Clark and Nye Counties. Populations of this cotton pest were at lower levels during 1964 than in previous years, as was the case in 1963. Bollworm was present in CALIFORNIA most of the 1964 growing season, with late populations persisting and increasing.

CABBAGE LOOPER (Trichoplusia ni) was not of much consequence on cotton in CALIFORNIA early in the season, but did continue in this crop throughout harvest. This looper was also of no importance on cotton in NEVADA during 1964 and required no controls. Local infestations of cabbage looper existed over much of TEXAS but were not unusually heavy, and the pest was present in cotton during the season in OKLAHOMA. Cabbage looper appeared in cotton in ALABAMA as early as June, but noticeable feeding on leaves was not evident until August. Populations did not reach damaging proportions except where considerable amounts of treatment had been made for the control of other cotton pests. There were no indications that special control efforts were made against this noctuid, but isolated fields were ragged as a result of high cabbage looper populations, which were later brought under control by naturally occurring virus infections. Infestations of cabbage looper in GEORGIA ranged light to heavy on cotton this season, with most infestations being light to moderate. A pathogen kept most infestations from becoming problems, and with the frequent rains in Georgia during the 1964 season, biological control of this pest was very good.

BEET ARMYWORM (Spodoptera exigua) was observed on cotton in all areas of GEORGIA during the season. Although infestations ranged light to heavy, most were light to moderate during 1964. Beet armyworm caused concern in some scattered portions of western TEXAS; however, populations were considerably less than those present in 1962. Medium larval populations of this noctuid were general on cotton in all areas of ARIZONA during July, August and September, with populations reaching a peak near the end of August. Beet armyworm was locally a light problem on cotton in CALIFORNIA during the 1964 season.

COTTON LEAFWORM (Alabama argillacea) was very light on cotton in OKLAHOMA during the 1964 season and caused very little damage to this crop.

CUTWORMS were of little or no consequence on seedling cotton this season in LOUISIANA. These pests damaged cotton in localized areas of TEXAS but did not cause any general damage during the year.

GARDEN WEBWORM (Loxostege similalis) was very light on cotton in OKLAHOMA this season and caused very little damage to this crop. Garden webworm, COTTON SQUARE BORER (Strymon melinus) and SALT-MARSH CATERPILLAR (Estigmene acrea) caused local damage to cotton in TEXAS but no general damage. Salt-marsh caterpillar was not the serious problem in ARIZONA that it was in 1963. Light infestations during late summer increased slowly during the fall but controls were required only in scattered areas. This pest infested cotton in Riverside and Imperial Counties, CALIFORNIA. Also in California, OMNIVOROUS LEAF TIER (Cnephasia longana) was more damaging to cotton during the 1964 season in the desert regions than in other parts of the State.

COTTON LEAF PERFORATOR (Bucculatrix thurberiella) was a general pest of cotton in Imperial and Riverside Counties, CALIFORNIA, and light to medium infestations were prevalent on cotton in central and western ARIZONA with peaks being reached during late October.

PINK BOLLWORM (Pectinophora gossypiella) infestations again showed a slight increase in OKLAHOMA this season, with moderate infestations being reported in cotton in several counties. The first larval specimen of the season in NEW MEXICO was found in a cotton bloom in the Carlsbad area of Eddy County on June 30. A late buildup of pink bollworm caused considerable damage to the late crop or terminal bolls in fields in southern Eddy County and in a small area near Columbus, Luna County. Pink bollworm infestations in ARIZONA as of December 11, 1964, involved 9,210 acres on 11 properties in Maricopa County, 295 acres on 3 properties in Pima County and 2,004 acres on 36 properties in Pinal County. Graham, Cochise and Greenlee Counties, Arizona, are considered 100 percent infested. Surveys for pink bollworm in NEVADA during 1964 were negative.

APHIDS caused localized damage to cotton in TENNESSEE during the 1964 season. COTTON APHID (Aphis gossypii) infestations ranged light to heavy on cotton in GEORGIA, with most infestations being light to moderate in nature. Early populations of 1-25 aphids per plant on two to 4-leaf cotton were present throughout ALABAMA. These were followed by large numbers of COVERGENT LADY BEETLE (Hippodamia convergens) which brought these populations of cotton aphid under control in 10-20 days. It was difficult to determine the amount of delay of plant growth, fruiting and yields this pest caused. One to two light applications of chemical controls were made, but this was not the general rule in Alabama this season. Cotton aphid infestations which occurred during the main fruiting periods of July, August and September and during the time when control efforts were underway for boll weevil and bollworms, were easily brought under control by the inclusion of suitable insecticides in the control program.

Cotton aphid populations did not develop to troublesome proportions anywhere in LOUISIANA during the 1964 season. Infestations of this aphid were slightly higher in ARKANSAS during 1964 than they were in 1963 and higher than the 5-year average. Cotton aphid was present in 27.7-42.8 percent of cotton fields in the State with a seasonal average of 37.9 percent. This compares with 28.1 percent during 1963 and a 5-year average of 25.7 percent. A small percentage of cotton fields in Arkansas had light, medium and heavy infestations of this aphid during the season, but very few fields were treated. Isolated infestations of this cotton pest occurred on seedling cotton in MISSOURI, but no serious problems developed. Late season buildups occurred following control applications for bollworms, and some fields required treatments for cotton aphid. Cotton aphid was noted on cotton in OKLAHOMA during the 1964 season, and infestations were light to moderate over TEXAS. Honeydew on cotton lint caused by cotton aphid was a minor problem in Dona Ana, Chaves and Eddy Counties, NEW MEXICO, but this aphid was unimportant on cotton in NEVADA with no control measures being required. Unspecified aphids were persistant for long periods of time on cotton in CALIFORNIA before buildups occurred. Cotton aphid was probably the most prevalent of the species involved.

WHITEFLIES were locally pestiferous on cotton in Riverside County, CALIFORNIA, but populations were generally lighter than in past years.

TARNISHED PLANT BUG (Lygus lineolaris) populations were extremely heavy on cotton throughout LOUISIANA during the early stages of cotton fruiting. These populations were associated with aborted terminals and other growth abnormalities. In areas receiving ample rainfall in Louisiana during the season, these pests moved out of cotton early and plants rapidly resumed normal growth and fruiting; however, infestations were unusually persistent in the Shreveport and Church Point areas. Insecticide applications against these pests failed to result in increased cotton yields. Tarnished plant bug, RAPID PLANT BUG (Adelphocoris rapidus) and Neurocolpus nubilus infested cotton in ARKANSAS during the 1964 season. The largest number of fields to have economic levels of the pests (40 per 100 terminals) was 35 of 7,478 fields scouted the fourth week of July. Tarnished plant bug, rapid plant bug and N. nubilus occurred in 84 percent of cotton fields scouted in MISSOURI during 1964, but only 5 percent of these infestations were economic. Unspecified PLANT BUGS caused scattered damage in TENNESSEE early in the season, but in many instances damage was not observed until late in the season when no bottom crop was present on cotton plants.

LYGUS BUGS (Lygus spp.) were present in heavy numbers on cotton in north central TEXAS, but were only of minor economic importance on cotton in NEW MEXICO during 1964. Some damage was noted on cotton in New Mexico in rows adjacent to alfalfa fields, after alfalfa had been cut. Heavy migrations of lygus bugs from forage crops to cotton in ARIZONA contributed to damaged squares and bolls during the early part of the season, and damage occurred on this crop until the first part of October. Medium infestations of these pests were present on cotton during July, August and September in Arizona. Spring infestations began to increase rapidly during May and early June, and damage became heavy in many sections, particularly in the central area of the State. Early season controls for lygus bugs were necessary. Population levels of lygus bugs in NEVADA were lower than in previous years as they were in 1963. However, numbers began increasing in late July and reached economic proportions during August in Clark and Nye Counties, with higher populations occurring in Nye County. These cotton pests were damaging to cotton in all areas of CALIFORNIA during the 1964 season.

COTTON LEAFHOPPER (Psallus seriatus) occurred in normal numbers in LOUISIANA, with high populations present only in the Shreveport area. Widespread populations were present over TEXAS, with heavy infestations present in central and north central areas of the State; however, overall populations were somewhat lower than in 1963. Cotton fleahopper was observed on cotton in OKLAHOMA during the season.

A BLACK COTTON FLEAHOPPER (Spanogonicus albofasciatus) was extremely heavy on cotton in central ARIZONA, and lighter populations occurred on this crop in the eastern area of the State and in Yuma County. Population peaks occurred about June 1 in the central area. Spotted populations of this pest caused some damage to cotton in Chaves, Eddy, Dona Ana and Luna Counties, NEW MEXICO, during June and July, but very little effort was made to control these populations.

STINK BUGS, mostly CONCHUELA (Chlorochroa ligata) and a few SAY STINK BUG (C. sayi), damaged cotton in the Columbus area of Luna County, NEW MEXICO, during August. Principal damage to cotton by unspecified stink bugs in CALIFORNIA occurred in Imperial County. Also in California, a FALSE CHINCH BUG (Nysius sp.) was more prevalent in many fields of cotton than it has been for several years.

THRIPS damage on cotton was observed in TENNESSEE during cool weather in late May and early June. Infestations of these pests ranged light to heavy on cotton in GEORIGA during 1964, but most infestations were light to moderate in nature. Thrips are usually a problem each year in Georgia and there is probably less year-to-year variation in degree of infestation of cotton insects in Georgia, with the exception of boll weevil. Thrips infestations on cotton in ALABAMA were statewide, as usual, especially in two to six-leaf stages. Most damage apparently occurred in the northern part of the State where cotton is grown on cold, humus soils and where young plants are slower to recuperate from early damage during cold, damp periods. The degree of damage to cotton in this area was difficult to determine. Large acreages of cotton in northern Alabama received preplant controls for thrips and other similar cotton pests. Infestations of TOBACCO THRIPS (Frankliniella fusca) were unusually high and widespread on cotton in LOUISIANA during 1964. Various thrips on cotton were of minor importance in ARKANSAS during the season. Infestations of tobacco thrips, FLOWER THRIPS (Frankliniella tritici) and Sericothrips variabilis were extremely heavy on late planted cotton in MISSOURI and controls were applied to approximately 4 percent of the scouted acreage in 1964.

Frankliniella spp. were noted on cotton in OKLAHOMA during the season, and various species of thrips were generally light to moderate on cotton in TEXAS, with heavy infestations being reported from central and northwestern areas of the Lone Star State. Unspecified thrips were only of minor importance on cotton in NEVADA, and light populations of these pests were present in many fields of cotton in CALIFORNIA during the 1964 season.

SPIDER MITES were slow to develop on cotton in CALIFORNIA but were the major cause for the application of controls in all cotton-growing areas of the State during the 1964 season. TWO-SPOTTED SPIDER MITE (Tetranychus telarius) was quite severe on cotton in some areas of California and STRAWBERRY SPIDER MITE (T. atlanticus) was the most prevalent species on cotton in the San Joaquin Valley where it caused severe defoliation in some instances. Spider mite infestations were lower in Nye County, NEVADA, than they were in 1963, but approximately one-third of seedling cotton required treatments. These pests were of no consequence on cotton in Clark County, Nevada, this season. Heavy infestations of Tetranychus spp. from May through August caused heavy, localized damage to cotton in central ARIZONA, as well as in Graham County and in areas of Yuma County. Infestations of Tetranychus cinnabarinus in the Brazos River bottom area of central TEXAS were heavier and more widespread than during the 1963 season. Other species of spider mites were present on cotton in varying populations over the State, with controls being required in some scattered fields.

Strawberry spider mite and other species of these pests became severe in isolated fields of cotton in MISSOURI, but spot and strip treatments were effective in preventing the spread of many early season infestations. Spider mite infestations were somewhat heavier on cotton in ARKANSAS during 1964 than they were in 1963 and heavier than the 5-year average. The season average percent of infested fields was 19.1 during 1964 compared with 16.7 percent in 1963 and a 5-year average of 12.7 percent; however, at no time during 1964 was more than 1 percent of the fields treated for these pests. Spider mites were of little consequence on cotton in LOUISIANA this year. Infestations and damage from spider mites were extremely light in the Sand Mountain and Tennessee Valley areas of ALABAMA during 1964. Partial or complete treatments were required on some farms, but no major control effort developed. Cotton on many small farms in the Sand Mountain area and a lesser number in the Tennessee Valley area were prematurely defoliated and damaged by spider mites through the negligence of growers. Spider mites ranged light to heavy on cotton in GEORGIA during the season, with most infestations being light to moderate. These pests were probably the third most economically important problem on cotton in Georgia during 1964. Spider mites were a continuous problem on cotton in TENNESSEE throughout the season. In many fields, damaging populations occurred on young cotton, and mite damage could be observed on all stages of cotton this year. Two-spotted spider mite was apparently more prevalent in Tennessee than other species. Spider mites were reported on cotton during the first half of June in NORTH CAROLINA as they were in 1963, and infestations were reported in all cotton-growing areas of the State by mid-July. These infestations declined, however, during the last week of July. Spider mite infestations were spotty thereafter and economic loss occurred only in isolated fields.

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